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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/461,158	12/14/1999	ANNE E. MILLER	042390.P6958	3401

7590

08/14/2002

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EXAMINER

BROWN, CHARLOTTE A

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 08/14/2002

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/461,158

Applicant(s)
Miller et al.

Examiner
Charlotte A. Brown

Art Unit
1765



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jul 2, 2002
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 28-33 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 28-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-14 and 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farkas et al. (US 6,001,730) in view of Kaufman et al. (US 6,063,306).

Farkas discloses chemical mechanical polishing slurry useful for polishing copper interconnects. A silicon substrate is provided. A dielectric layer is formed over the substrate. A trench is formed through the dielectric layer (Column 4, lines 42-48). A tantalum-based barrier layer is formed within the trench. The tantalum based barrier layer is one or more of tantalum, tantalum nitride, composites thereof or the like in a preferred form (Column 4, lines 49-54). A conductive copper layer is then deposited over a top surface of the barrier layer and within the trench in the dielectric layer (Column 4, lines 59-61). This reads on the applicant's limitation of depositing copper over the diffusion barrier and over a top surface of the dielectric layer. The copper layer is then placed into contact with a chemical mechanical polishing slurry. In order to

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remove copper material from the layer, the slurry forms a thin copper oxide or oxidized layer on a top of the copper layer. This reads on the applicant's limitation of forming a protective layer over the copper film during polishing. The slurry has a pH of 9.0 to 11.0. The slurry contains 1.0 wt% to 12.0 wt% of silica abrasive (Column 7, lines 31-40). This reads on the applicant's limitation of polishing the copper with a high pH slurry having less than or equal to 10 wt% of abrasive.

Unlike the claimed invention Farkas does not teach forming a copper diffusion barrier layer in the trenches.

Kaufman discloses a chemical mechanical polishing slurry useful for polishing a copper/tantalum substrate. Kaufman discloses that tantalum or tantalum alloys can include a layer such as Ta/TaN/Cu (Column 4, lines 36-46).

It is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Farkas with the method of using a copper diffusion barrier layer as taught by Kaufman since Farkas is not particular about the type of tantalum-based barrier layer used in his process and therefore any tantalum-based barrier layer would have been anticipated in order to produce an expected result.


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3. Any inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is 703-305-0727. The Examiner can normally be reached during the hours of 9:00AM to 6:30PM.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

CAB

August 8, 2002


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